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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/582,609	09/06/2000	Gunter Fuhr	A33331-PCT	4278

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EXAMINER

PADMANABHAN, KARTIC

ART UNIT	PAPER NUMBER
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1641

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DATE MAILED: 03/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/582,609

Applicant(s)

FUHR ET AL.

Examiner

Kartic Padmanabhan

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 December 2002.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 29-43, 45-51, 53, 55 and 56 is/are pending in the application.
- 4a) Of the above claim(s) 37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 29-36, 38-43, 45-51, 53, 55 and 56 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 29-43, 45-51, 53, 55 and 56 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/6/00 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \*   c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other:  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 29-30, 32-36, 39-43, 53, and 55-56 are rejected under 35 U.S.C. 102(b) as being anticipated by Morishima et al. (1997). The reference discloses a microchannel system for the screening of E. coli, wherein the bacteria are manipulated by dielectrophoretic force and radiation pressure of a laser tweezer (abstract). The technique of the reference combines optical trapping and electric forces for the manipulation of particles and isolation of one particle. The microelectrodes of the device of the reference induce migration of the bacteria, and the E. coli are three-dimensionally optically trapped at the focal beam of the laser beam, which is within the electrode arrangement. By controlling the magnitude of the electric field, unneeded bacteria are dispersed (p. 156). In addition, with the use of a laser manipulator, the bacteria can be manipulated as desired. According to the reference, the focal point can be moved arbitrarily with two degrees of freedom, wherein the trapped objects follow the focal point (page 158). The distance between the focus and capture area may still be varied and measured, if desired. The characteristics of each E. coli are dependent on optical recognition using fluorescence microscopy (p. 157). As seen in Figures 2 and 3, pairs of electrodes are spaced from each other on a substrate.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459

(1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morishima et al. (1997) in view of Svoboda (1994).

Morishima et al. teach the use of electric fields and laser tweezers, as previously discussed. However, the reference does not teach the calibration of the optical cage.

Svoboda teaches force calibration wherein laser light in a focused beam is directed towards a particle which forces fluid past the stationary particle. The fluid drag force is balanced by the trapping force, thereby calibrating the cage (pages 267-268).

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It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to calibrate the optical cage as taught by Svoboda with the method of Morishima et al. because calibration allows for more accurate and meaningful results.

7. Claims 38 and 45-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morishima et al. (1997) in view of Fuhr et al. (1994).

Morishima et al. teach the use of electric fields and laser tweezers, as previously discussed. However, the reference does not teach the manner in which the microelectrodes are constructed or the arrangement of the electrodes.

Fuhr et al. teach cell manipulation and cultivation under the influence of an electric field. The electrode array of the reference allows for the application of high-frequency electric fields into cell suspensions. The micro scaled electrode structures were manufactured on glass or silicon using semiconductor technology (abstract). The electrodes were made of gold. Four electrodes were spaced apart on the surface of a glass chip (substrate). The electrodes were also optionally coated with thin dielectric layers.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to use the arrangement of electrodes and method of manufacture taught by Fuhr et al. with the method and device of Morishima et al. because Fuhr et al. teaches that their electrode system allows for electric fields that can be used in original cell culture media, such as the E. coli suspensions of Morishima et al. In addition, one could have easily used the manner in which the electrodes were made and arranged of Fuhr et al. with the method and device of Morishima et al. with a reasonable expectation of success. The electrodes of Fuhr et al. were made using conventional technology and materials

***Response to Arguments***

8. Applicant's arguments filed 12/23/02 have been fully considered but are not persuasive.

9. Applicant's argument that Morishima et al. does not disclose an electrical field with capture area is not convincing. Specifically, the reference discloses the generation of a non-uniform electric field around the E. coli particle, which causes migration of the particle, which leads to it being trapped at the focal point of the laser beam. See page 156.

10. Applicant also urges that the reference fails to disclose the limitations of steps c and d of claim 55, but has provided no reasoning or basis for this position. Rather, applicant has merely made a conclusion without any element of support, which argument is unconvincing on its face. However, to the extent that this position merits discussion, it is noted that the reference discloses the control of the magnitude of the electric field, and further, the reference discloses the turning on of the laser, which, interpreted in its broadest sense, constitutes varying the light power of the light beam. Only when the light beam is varied (turned on), can it be detected when the particle is in the capture area, which is sufficient to meet the limitations of claim 55, as well as any other claim to which the reference was applied.

11. Applicant's arguments with respect to the alleged improper combination of Morishima et al. with other references as the basis of 35 USC 103 rejections is based primarily on the premise that Morishima is not properly applied under 35 USC 102, a position that has already been addressed and rejected.

***Conclusion***

Claims 29-36, 38-43, 45-51, 53, and 55-56 are rejected.

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**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kartic Padmanabhan whose telephone number is 703-305-0509. The examiner can normally be reached on M-F (8:30-5:00).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 703-305-3399. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-5207 for regular communications and 703-305-3014 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.

Kartic Padmanabhan  
Patent Examiner  
Art Unit 1641

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March 10, 2003

  
LONG V. LE  
SUPERVISORY PATENT EXAMINER  
TECHNICAL CENTER 1600  
03/10/03